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CASE REPORT
Acute Transverse Myelitis Associated With Dengue Viral Infection

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Abstract

Background: Acute transverse myelitis is a rare manifestation of dengue viral infection. Four cases have been previously reported in the literature.

Objective: To report a case of a 61-year-old woman who developed acute transverse myelitis 6 days after the onset of a dengue viral infection.

Findings: Magnetic resonance imaging of spinal cord showed hypersignal intensity on T2W at T9-T10. Laboratories studies revealed a high titer of hemagglutination inhibition of dengue virus. Treatment with intravenous pulse methylprednisolone and physiotherapy yielded a partial recovery, followed by complete resolution at 1 year postinfection.

Conclusion: Acute transverse myelitis is a rare manifestation of dengue infection that can occur in either the peri-infectious or postinfectious phases.

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Key Words: Acute transverse myelitis, paraplegia; Dengue fever; Dengue hemorrhagic fever; Methylprednisolone; Flavivirus

INTRODUCTION

Dengue fever and dengue hemorrhagic fever are increasingly recognized important emerging infectious diseases in Southeast Asia. The annual incidence of dengue infection ranged from 25 to 150:100,000 in Thailand and nearby countries such as Vietnam and Malaysia, based on the epidemic status. The age group of 15 to 24 years had the highest infection rate, and the annual incidence of dengue fever was highest in southern Thailand. Lower incidences were reported from Cambodia, Indonesia, Philippines, and Lao People's Democratic Republic (does not exceed 25:100,000) (1,2).

Various neurologic complications of dengue viral infection have been reported, including central and peripheral nervous system involvement. Encephalopathy, encephalitis, seizures, mononeuropathy, polyneuropathy, and Guillain–Barré or Miller-Fisher syndromes have been seen (3–6). However, spinal cord involvement associated with dengue viral infection has been rarely mentioned. There have been only 4 previously reported cases of transverse myelitis in association with dengue infection (7–10).

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Case Report

A 61-year-old previously healthy woman presented with an acute onset of a fever and headache followed by generalized petechiae on both lower extremities 9 days prior to admission. Initial blood count showed a hematocrit of 40%, a normal total leukocyte count but a low platelet count of 20,000 cells /mm^3. No bleeding was evident. Three days before admission the fever resolved, and she developed acute urinary retention followed by acute paraplegia with sensory loss on the next day.

Neurologic evaluation revealed weakness of her lower limbs of grade 2/5 and hypotonia, bilateral Babinski signs and briskness of both knee and ankle deep tendon reflexes, T10-level sensory deficit, impaired joint position sensation of the lower limbs, and absence of anal sphincter tone.

Serologic testing for leptospirosis, scrub typhus, and murine typhus were all unremarkable, and anti-HIV and Venereal Disease Research Laboratories (VDRL) were both nonreactive. The hemagglutination inhibition index titer for dengue infection was more than 1:10,240. Immunologic assays for dengue infection both in the serum and cerebrospinal fluid (CSF) were not available. Magnetic

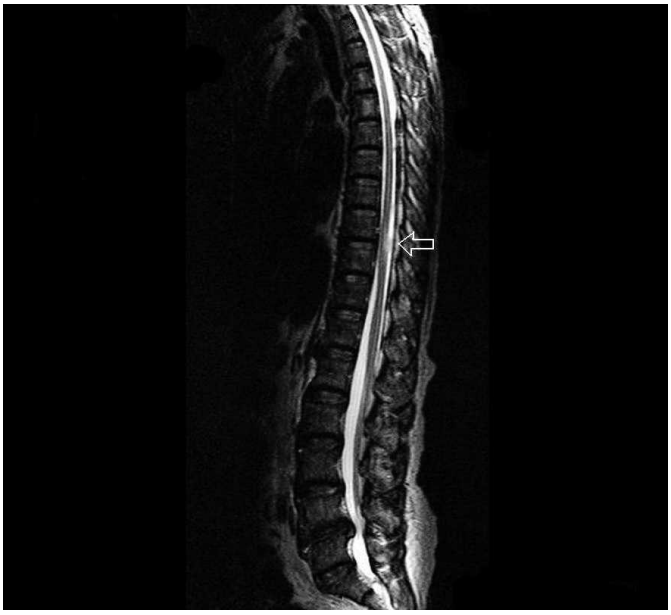

Figure 1. *The MRI of the thoracic and the lumbar spine showed abnormal hypersignal intensity on T2W at dorsal part of spinal cord at the level of T9-T10 (arrow).*

resonance imaging (MRI) of the thoracic spine showed hypersignal intensity on T2W at the dorsal part of the thoracic spinal cord at the level of T9-T10 (Figure 1). CSF analysis showed clear fluid with an opening pressure of 13 cmH_2O and no cells. CSF glucose level was 59 mg/dL, and CSF protein was 61.4 mg/dL. The simultaneous serum blood glucose was 106 mg/dL. CSF culture for bacteria and fungus showed negative results.

The patient was diagnosed with acute transverse myelitis in association with a dengue viral infection and treated with intravenous pulse methylprednisolone 1g/day for 3 consecutive days. Ten days after the onset of symptoms, after undergoing intensive physiotherapy, both lower limbs were graded as 3/5, and sphincter function was normal. Motor function continued to improve, and neurologic recovery was complete after 1 year of follow-up.

DISCUSSION

Dengue infection is caused by Flavivirus in the Flaviviridae family and transmitted by the *Aedes aegypti* mosquito. Dengue virus is characterized by 4 antigenically related serotypes, resulting in a spectrum of clinical presentations from subclinical to fatal manifestations called dengue hemorrhagic fever and dengue shock syndrome. Diagnosis is confirmed by the isolation of virus from blood during the viremic (or febrile) period and the presence of IgM and IgG antibody by Capture-ELISA during the postfebrile period. Differential diagnosis includes bacteremia, leptospirosis, rickettsiosis, malaria, and acute HIV infection syndrome. Treatments are aimed at maintaining adequate hydration and managing potentially fatal complications.

The duration between the onset of infection and the development of acute transverse myelitis ranged from 2 to 16 days in the 4 previously reported cases. The neuropathogenesis of the central nervous system involvement in dengue infection has been poorly understood; both direct infection and postinfectious immune-mediated neural injury have been postulated. The development of neurologic symptoms in close association with the initial dengue infection (peri-infectious) and flaccid paraplegia are attributed to direct viral invasion of the nervous tissue, whereas the late appearance of neurologic disorders (postinfectious) and spastic paraplegia are considered immunologically mediated neural injury (10). Direct invasion of the central nervous system by the dengue virus is supported by the isolation of the dengue virus antigen from CSF and spinal cord tissue in the cases of transverse myelitis immediately following dengue infection (8,9,11). A high IgM/IgG index for dengue virus in the CSF is also useful for the diagnosis of a direct viral infection; however, the MRI study of the spinal cord is so variable that it can even provide a negative result (7). Combining the previously reported cases with the present case, it appears that acute transverse myelitis may occur during either the early (peri-infectious) or the late (postinfectious) phases of dengue fever. This suggests the possibility of both direct and postinfectious mechanisms in dengue fever–associated transverse myelitis.

CONCLUSION

This woman developed acute transverse myelitis 6 days after the dengue infection. A direct dengue infection of the spinal cord is likely although the confirmatory tests to demonstrate the presence of the dengue virus or its immunologic response in the central neural tissue were not available. A cause-and-effect relationship between dengue virus infection and acute transverse myelitis is highly probable in this case. However, the presence of hyperreflexia and Babinski sign with hypotonic paraparesis was a distinct clinical feature in this particular case. Therefore, the clinical characteristics of transverse myelitis may be variable.

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